



# **How to manage food price instability in developing countries?**

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## Abstract

The food crisis of 2007-2008 and the resulting urban riots observed in about forty developing countries placed the question of price instability at the very heart of the debate. The paper states that, since the 80s, the prevailing idea is that the best option is to manage risks without "affecting prices" by means of private risk management instruments (crop insurance, future markets...) in conjunction with the provision of safety nets for vulnerable populations. Indeed, the stabilisation of agricultural prices is thought to be not desirable because i) it prevents prices from playing their role of a signal guiding production and trade behaviour and ii) by dissociating price movements from production variation, it prevents producers from taking advantage of the "natural insurance" resulting from the negative correlation between prices and harvest volumes. Nevertheless, this strategy had difficulty in standing up to the facts: the development of private risk-management instruments did not come to fruition and the safety nets did not succeed in preventing the deterioration of the nutritional situation of vulnerable households. The paper shows that the arguments against price stabilisation (the informational role of prices and the "natural insurance" of producers) do not hold when the different causes of price instability are taken into account. It also proposes a typology of the causes of instability. Instability may be "natural", as a result of natural hazards affecting production (rain, locusts...). However, it may also be "imported" from international markets or "endogenous", in other words generated by the markets themselves (speculative bubbles, cobweb phenomena, etc). Lastly, the paper shows that the causes of instability are a crucial factor in the performance of price stabilisation strategies and instruments. It therefore presents the relevant stabilisation policies for each cause of instability.

## Keywords

Price instability, risk management, price stabilisation, food security, green revolution, markets modernisation

## Comment gérer l'instabilité des prix alimentaires dans les pays en développement ?

### Résumé

La crise alimentaire de 2007-2008 et les émeutes urbaines qu'elle a engendrées dans une quarantaine de PED ont conduit à mettre la question de l'instabilité des prix alimentaires au cœur des débats. L'article rappelle que, depuis les années 80, l'idée domine que la meilleure option consiste à gérer les risques sans « toucher aux prix » grâce à des instruments privés (assurance récolte, marchés à terme...) complétés par des filets de sécurité pour les populations vulnérables. En effet, la stabilisation des prix agricoles est considérée comme non souhaitable car d'une part elle empêche les prix de jouer leur rôle de signal guidant les comportements de production et d'échange et d'autre part, en déconnectant l'évolution des prix de celle de la production, elle empêche les producteurs de bénéficier de « l'assurance naturelle » procurée par la corrélation négative entre prix et niveau des récoltes. Cependant, cette stratégie a mal supporté l'épreuve des faits : le développement des instruments privés de gestion des risques ne s'est pas produit et les filets de sécurité ne sont pas parvenus à enrayer la dégradation de la situation nutritionnelle des ménages vulnérables. L'article montre que les arguments à l'encontre de la stabilisation des prix (le rôle informationnel des prix et « l'assurance naturelle » des producteurs) ne tiennent pas si on prend en compte la diversité des causes de l'instabilité des prix. Il propose en outre une typologie des causes de l'instabilité. Outre l'instabilité d'origine « naturelle » (due aux aléas naturels affectant la production comme la pluie ou les attaques de criquets), l'instabilité des prix peut en effet être « importée » des marchés internationaux ou être « endogène », c'est-à-dire être générée par le fonctionnement des marchés eux-mêmes (bulles spéculatives, phénomènes de cobweb...). Enfin, l'article montre que la performance des stratégies et instruments de stabilisation des prix dépend de manière cruciale des causes de l'instabilité. Il présente les politiques de stabilisation adaptées à chacune des causes d'instabilité.

### Mots clefs

Instabilité des prix, gestion des risques, stabilisation des prix, sécurité alimentaire, révolution verte, modernisation des marchés

JEL: D84, G13, L11, O24, O33, Q11, Q18

# How to manage food price instability in developing countries?<sup>1</sup>

Franck Galtier\*

## 1. Price instability: a major issue for food security and development

The concept of price instability refers to the idea that prices fluctuate considerably over time. The term instability is preferred to “variability” or “volatility” as it explicitly refers to the concept of equilibrium and that is exactly what it entails: price instability reflects the disequilibria between supply and demand. As we shall see later, these may be real disequilibria or merely disequilibria expected (rightly or wrongly) by economic actors. Whatever the case, price instability always refers to short term disequilibria. Price movements over a long period (resulting for example from technological progress or changes in demand) are not perceived as price instability. That is why we generally measure price instability using time series corrected for their long-term trends, referred to as “detrended” series. Different indicators exist, and the most frequently used is the coefficient of variation, which is calculated as the ratio of the standard deviation to the mean. The relevance of this indicator is nevertheless contested by certain specialists who believe that small fluctuations around an average price are unimportant. They believe that only the extreme values of a rising or falling price really count.

Concern regarding the issue of price instability can be traced back at least as far as the 18th century, with the publication of Galiani’s *“Dialogues sur le commerce des bleds”* (Dialogues on the grain trade, 1770).

Much more recently, the food crisis of 2007-2008 and the resulting urban riots observed in about forty developing countries placed the question of price instability at the very heart of the debate. The price instability witnessed in 2007-2008 contrasted sharply with the relative stability of international cereal prices over the past 15 years: while the price of rice (100% broken Thai rice) had remained between 150 and 300 US dollars per tonne since 1994, it exceeded 800 US dollars per tonne during the recent crisis. Most experts agree that we have entered a new era characterised by much more unstable food prices on the international markets (Mitchell and Le Vallée 2005; Masters and White 2008; Sarris 2008). A high level of food price instability in developing countries may, then, have serious consequences on food security both in the short term (consumer access to food) and in the long term (incentive for producers to invest and increase production).

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<sup>1</sup> This article summarises the main results of a study concerning instruments devoted to food price instability management (Galtier et al. 2009). This study was made possible by the financing provided by the Agence Française de Développement (AFD) and the French Ministry of Foreign and European Affairs (MAEE). The study (entrusted to the ECART consortium) was coordinated by Franck Galtier and involved four research institutions: CIRAD, IRAM, the NRI and the University of Wageningen (WUR). The following researchers and experts participated in the work: Roger Blein, Nicolas Bricas, Kees Burger, Ruth Butterworth, Jérôme Coste, Jonathan Coulter, Benoît Daviron, Johny Egg, Françoise Gérard, Gardien Meijerink, Denis Michiels, Gideon Onumah, Jean-Francois Sempere, Marcel van Asseldonk and Tancrède Voituriez. Special thanks to John Staatz for revising the translation.

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## 2. Which instruments to manage price instability?

We propose to classify the different instruments according to their objective -to stabilise prices or reduce the effects of price instability- and their mode of governance -public or market-based-.. Combining these two elements gives rise to the following four categories (cf. table 1).

Table 1: The different categories of price instability management instruments

Objective	Stabilise prices	Reduce the effects of price instability
Governance		
Market-based	Category A	Category B
Public	Category C	Category D

The instruments in category A (or A-instruments) are intended to facilitate the spatial and temporal arbitrage undertaken by market actors (producers, traders, consumers). They essentially refer to the cereals markets and concern both infrastructure (transport, communication and storage) and market institutions (such as the existence of grades and standards, warehouse receipt systems or exchanges facilitating the aggregation and the clearing of supply and demand). The main idea of A-instruments is that the arbitrage of market actors leads to the homogenisation of prices over time and space (as far as storage and transport costs permit), in theory reducing the level of instability.

B-instruments are also market-based instruments. The aim of these tools is to prevent price instability from causing income instability (which could in turn affect consumption and production). In practical terms, this means enabling economic actors to cover themselves against the risks linked to price variations (forward contracts, futures, put options, and call options) and harvest variations (crop insurance, weather index insurance).

C-instruments are public intervention tools aimed at ensuring that the price does not exceed certain limits. Depending on the case, the tools may include floor prices, ceiling prices or price bands. C-instruments concern production controls, border controls or stock controls. They include instruments as varied as input subsidies, import and export taxes and subsidies (fixed or variable), quotas, prohibitions or public buffer stocks.

D-instruments are public intervention tools aimed at supporting household incomes when prices are high. They involve transfers, generally restricted to certain categories of poor or vulnerable households (targeting). The instruments may vary according to the type of good transferred (money, vouchers, food or even inputs), the level of cost coverage (donations or simple subsidies as in the case of sales at moderate prices) and whether or not a counterpart (in general labour) is required in return for the transfer

There is a considerable body of literature (which is at times highly conflicting) concerning the advantages and disadvantages of these different instruments.

For a long time, the search for a solution to the question of price instability focussed on C-instruments. After the Second World War, leading economists (including Keynes in 1942) recommended the introduction of international price stabilisation schemes, which were indeed implemented in the form of several “commodity agreements” introduced for sugar (1954), coffee (1962), cocoa (1972), and natural rubber (1980). The efforts towards stabilisation reached a peak in 1976 with the Integrated Programme for Commodities put forward by UNCTAD with a view to building a “new international economic order” by stabilising the prices of the 10 main commodities. Nevertheless, during the 1980s, the beneficial effect of price stabilisation was contested in academic terms (Newbery and Stiglitz 1981), while at a political level, price stabilisation mechanisms were gradually abandoned (Gilbert 1996).

Since then, the main focus has been on B-instruments. The prevailing idea is that the stabilisation of agricultural prices is not desirable because i) it prevents prices from playing their role of a signal guiding production and trade behaviour and ii) by dissociating price movements from production variation, it prevents producers from taking advantage of the “natural insurance” resulting from the negative correlation between prices and harvest volumes. The best option therefore seemed to involve stabilising income without “affecting prices” by means of private risk management instruments (B-instruments) in conjunction with the provision of safety nets for vulnerable populations (D-instruments). However, the expected boom in risk management instruments did not occur, despite the initiatives aimed at promoting the use of such instruments by producers, traders and even the governments of developing countries (CRMG 2008).

This has led to A-instruments being highlighted (Byerlee et al. 2005). The idea is that the modernisation of the grain market, in particular through the development of warehouse receipt systems, could be the solution (Coulter and Onumah 2002).

Finally, the food crisis of 2007-2008 saw C-instruments regaining a certain legitimacy, as demonstrated by the proposals made by IFPRI and the World Bank with a view to stabilising the price of cereals on the international markets (Von Braun and Torero 2008; Lin 2008; Von Braun, Lin and Torero 2009).

These different works all attempted to find a solution to the problem of price instability within a single category of instrument, the other categories being perceived either as of secondary importance or even as obstacles to the development of the instruments in the “right” category due to the distortions they would generate. In contrast, this study highlights the complementarities between the categories of instruments. In doing so, it echoes the “discordant voices” who, based on the success of the various Asian experiences, continued to defend “pragmatic” stabilisation of cereal prices using a combination of several public and private instruments (Timmer 1989; Dawe 2001). Another contribution of this study is to highlight the need to take the causes of price instability into account in designing stabilisation policies.

### **3. The major role of the causes of price instability**

Another major characteristic of the literature is that the performance of the price stabilisation instruments is usually discussed without taking account of the cause(s) of price instability. However, the same instrument may have a stabilising, destabilising or non-existent effect depending on the type of instability with which it is confronted (Boussard et al. 2006).

We propose to distinguish three types of instability as categorised by the root cause (cf. figure 1).

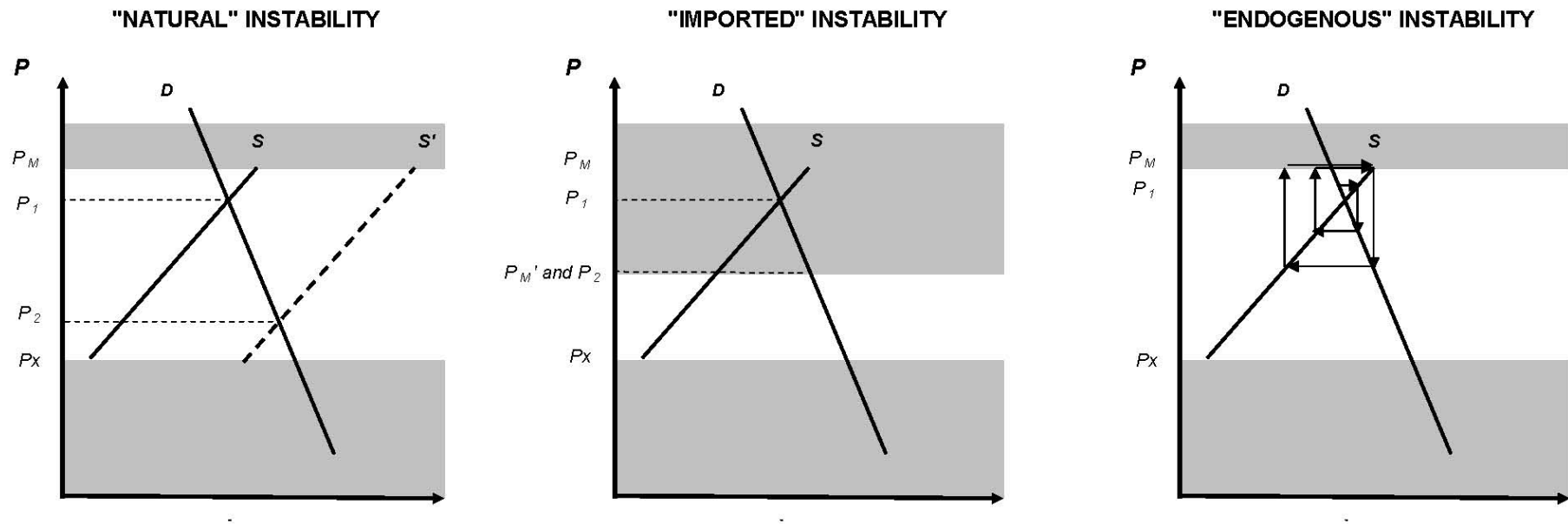
The type of instability most often taken into account is “natural instability”. In this case, price instability is caused by the variability of supply from one year to the next resulting from natural hazards affecting production (rain, locusts etc.). Hence, in figure 1, a “poor harvest” (represented by curve S) results in price  $P_1$ , whereas a “good harvest” (curve S') results in price  $P_2$ .

However, if we consider price instability within a country, it may also be “imported” from the international markets (Byerlee et al. 2005). In this case, it is the variability of the import parity price ( $P_M$ ) or export parity price ( $P_X$ ) that causes the price instability on the domestic market.

Finally, price instability can also be due to the variability of the market actors' expectations. In this case, we refer to endogenous instability, the term “endogenous” recalling the idea that instability is generated by the functioning of the market itself (Boussard 1996; Boussard et al. 2006). The domestic price can therefore be unstable without any movement in the market fundamentals (domestic supply and demand curves and parity prices). In light of the time lag between the production decisions and the harvests, production decisions (choice of crops and production techniques) are taken according to the expected prices and not the current prices. If the expectations are based on the past evolution of the market, an endogenous instability may occur as the instability of the expectations leads to a price instability which in turn consolidates the instability of the expectations. A famous example is the *cobweb* scenario in which the price expected for the next period is equal to the current price (Ezekiel 1938). So if  $P_t$  is high, many producers increase the sown areas or intensify their production, thereby leading to the low level of  $P_{t+1}$ , discouraging production and in turn causing  $P_{t+2}$  to be high (cf. figure 1). Another scenario is that of the *phenomena of speculative bubbles*. In this case, the market operators expect that the variation between  $t$  and  $t+1$  will have the same sign as the variation observed between  $t-1$  and  $t$ . Accordingly, increases follow increases, causing a “bubble”, i.e. a disconnection with the movement of the fundamentals, until the market “bursts”.

Most experts agree that “imported” and “endogenous” types of instability will play a major role in the coming years. This point is illustrated by the price crisis of 2008, which was in large part due to speculative movements and panic on the physical market (Timmer 2009; Wright 2009).

Figure 1: The different causes of price instability



## 4. The “optimum strategy”: stabilising income “without affecting prices”

The “optimum strategy” has been the dominant approach since the end of the 1980s (in both the academic and political arenas). Its essential message is that it is preferable to adopt category B and D instruments rather than those in category A or C.

### 4.1. The justification of the “optimum strategy”

The main arguments put forward in favour of the optimum strategy are the informational role of prices and the “natural” insurance for producers.

*Prices as signals.* It is a well known fact that prices aggregate and transmit a signal concerning the scarcity of goods. By the same token, they guide the behaviour of economic operators (Hayek 1945). “Affecting prices” would therefore damage the quality of resource allocation.

*“Natural” insurance for producers.* Agricultural price stabilisation has an uncertain effect on the instability of the income generated by production. When harvests are good, prices are low, which can cause producers to find themselves in a more disadvantageous position than in the event of a poor harvest. The negative correlation between harvest size and the price level therefore represents a sort of “natural insurance” for producers (price and production risks partially offset each other). Newbery and Stiglitz (1981) made this “natural insurance” aspect a central theme of their arguments. As stabilising food prices generally means reducing the correlation between prices and harvests, this may in fact increase the instability of producers’ incomes (Newbery and Stiglitz 1984).

### 4.2. The instruments of the optimum strategy

The optimum strategy is primarily founded on **B-instruments**; i.e., instruments hedging price and insuring harvest risks (crop and climate insurances, futures, put options, call options etc.).

These instruments demonstrate different characteristics that would appear to make them the ultimate solution to price and harvest instability: they are *symmetrical* (they provide protection against both excessive and insufficient price levels), *flexible* (as there are different types of contracts, the actors can choose the level of protection that they prefer) and *predictable* (if a trader holds a call option, he know in advance that he is protected against an excessive price rise).

Moreover, various complementarities exist between the B-instruments. These complementarities come into play between instruments which protect against different risks (in particular between those that protect against harvest risk and those that protect against price risk). They also bring together instruments with an *ex ante* effect (by stabilising income, such as crop insurance and futures) and those with an *ex post* effect (helping market actors to react to a fall in income, such as credit). Finally, there is also a *complementarity of scale* between instruments. If the risks borne by the actors in the same zone are correlated (such as the risk of a poor harvest), the agents providing them with B-instruments (insurance company, credit institution etc.) are also at risk but can in turn use other B-instruments to protect



themselves. For example, companies providing farmers with crop insurance in a particular zone can protect themselves by means of weather index insurance while traders who provide forward contracts can protect themselves via futures markets.

The debate on price instability has long focused on cash crops and mining products (coffee, cocoa, rubber, tin etc.). In this context, the optimum strategy relied solely on B-instruments. Shifting the debate to food prices led to D-instruments being taken into account. It is obvious that vulnerable populations in developing countries do not have the means to use B-instruments to protect themselves against harvest risk or price risk. It therefore seemed necessary to offer them free instruments fulfilling the same protective role as B-instruments: this is the role of D-instruments.

**D instruments** are intended to transfer a good towards certain categories of household (possibly in exchange for a counterpart—frequently labour, as in a cash-for-work program). They are therefore characterised by a) the type of good transferred, b) the nature of counterpart, c) the type of targeting and d) the permanent or temporary nature of the transfers. The good transferred may be food, money or, more rarely food vouchers or inputs. When a form of counterpart is involved, it may take the form of work or money (if the good transferred is only partly subsidised). Targeting can take several different forms. One particularly interesting system is “self-targeting,” which involves creating conditions whereby only those households requiring aid ask for it. Aid measures may be permanent or only activated in times of crisis (in particular in the event of a poor harvest or a strong increase in food prices). Combining the different elements of these four attributes allows a plethora of instruments to be defined.

In the context of the predominance of the “optimum strategy”, D-instruments were perceived in the same light as B-instruments. Once again, this meant allowing economic actors to protect themselves against the risks linked to harvest variability and price instability.

Are B-instruments and D-instruments antagonistic or complementary? Different elements would lead us to believe that they are complementary. Indeed, they target different actors. Moreover, the scope of relevance of the different instruments depends on the characteristics of the risks.

First, *B-instruments are oriented more towards producers and traders while D-instruments are intended more for consumers*. Nevertheless, the distribution between the two categories of instrument is more complex. Microcredit is also used as a consumer credit. Moreover, safety nets tend increasingly to become *ex ante* protective tools aimed at avoiding the need for households to reduce their capital (productive capacities retained). More generally, the distinction between producers and consumers is somewhat blurred: in Africa, numerous households producing grain are in deficit and are obliged to buy from the market. Finally, under-consumption affects human capital, which itself has a direct influence on the productive capacity of the households.

Second, *actors with access to B-instruments are primarily affluent (or at least medium-sized), whereas those benefitting from D-instruments are poor and vulnerable households*. Once again, this generalisation must be qualified. Some poor households may have access to certain B-instruments (such as microcredit). Conversely, the operational difficulties linked to targeting may mean that non-poor households benefit from D-instruments.

Furthermore, *the scope of relevance of the different instruments depends on the characteristics of the risks*. The rules for using the instruments (in categories B and D) put

forward by Cordier and Debar demonstrate this phenomenon (cf. table.2). The authors believe that when risk is not too high, insurance can be sufficient, provided the risk is not systemic risk. If it is a systemic risk, other instruments (such as hedging) must be used, but this is only valid if the risk is sufficiently high for it to be worth bearing the cost of these instruments. If the risk is lower, it can in this case be managed by means of taxes or subsidies on either production or consumption (such “fiscal smoothing” can be tolerated by the budget if the risk is low). Finally, for very high levels of risk, (“wild” unpredictable risk that does not follow known statistical laws), none of these instruments is effective, and public safety nets must be activated (which must be reserved for vulnerable households in order to limit the cost and the distortions).

Table 2: Rules for using B-instruments and D-instruments according to the characteristics of the risks:

Level of correlation between individual risks	Independent risk	Systemic risk
Magnitude of risk		
High risk (“wild”)	Public safety nets (“targeted aid”)	
Average risk	Insurances	Risk hedging mechanisms (futures, options)
Low risk		Taxes and subsidies for production or consumption (“fiscal smoothing”)

Source: Following Cordier and Debar (2004)

Overall, the “optimum strategy” offers a very attractive combination of instruments. The different B-instruments are linked to each other by means of different complementarities based on the type of risk covered (harvest risk, price risk or other risks), the level of intervention in the risk chain (mitigation or reaction) and the relevant scale. These different complementarities should facilitate a reduction in the cost of these instruments. Moreover, the use of B-instruments by a sufficient proportion of the market operators will help to stabilise prices (by increasing investments in production and storage). B-instruments will therefore exercise a “multiplier effect”: their adoption by some producers and traders would have beneficial effects on all the others (Williams and Wright 1991). Finally, in the case of poor or vulnerable households, it is possible to implement safety nets and other D-instruments without generating negative interference with B-instruments.

This highly attractive strategy has been, and continues to be, fascinating to the academic world and decision-makers; the general feeling is that *it should* work. Nevertheless, as time passed, doubt began to creep in.

## 5. Criticism of “optimum strategy”

The “optimum strategy” has played a dominant role since the 1980s. It has nevertheless had difficulty in standing up to the facts: the much anticipated development of B-instruments did not come to fruition and the D-instruments did not succeed in preventing the deterioration of the nutritional situation of vulnerable households. Moreover, its theoretical foundations are shown to be fragile when the different causes of price instability are taken into account. Indeed, in addition to “natural” instability (implicitly assumed in most analyses), instability

can be “imported” or “endogenous”, which significantly alters the expected effects of the optimum strategy and those of the alternative strategy of price stabilisation. We can therefore call into question the idea of not “affecting prices” to avoid muffling market signals and the idea that price stabilisation would have little effect on incomes due to the “natural insurance” provided by the negative correlation between price and production.

### 5.1 The optimum strategy confronted by the facts

With the liberalisation of agriculture and the dismantling of international market regulation agreements, many people thought that the futures and option markets would experience unprecedented growth. Others quickly expressed their scepticism concerning B-instruments, claiming that their development would be undermined from the inside by problems of adverse selection and moral hazard (Newbery and Stiglitz 1981). Many nevertheless believed that these problems could be overcome. The search for a solution was to focus on the complementarities between instruments, and in particular between crop insurance and hedging instruments, as well as between these two groups of instruments and credit. More recently, complementarities of scale have taken centre stage (Larson et al. 1998). The idea is that the problems of moral hazard, adverse selection and systemic risk can, in part, be resolved by pooling the risks and by reassurance: an intermediate structure provides hedging services (crop insurance, forward contracts etc.) to numerous producers and protects itself by using other instruments more suitable to its scale of intervention (weather index insurance, futures, options etc.). This nevertheless proved insufficient, and public support was envisaged. The World Bank’s *Commodity Risk Management Group* therefore developed a highly pragmatic approach to promote the use of B-instruments (CRMG 2008). The facts nevertheless proved the sceptics right: the much anticipated development of risk protection instruments never materialised. Neither the emergence of new tools, nor the implementation of intermediaries pooling the risks, nor the multi-faceted support from the public authorities has induced a real development of B-instruments.

At the same time, D-instruments did not succeed in preventing the reduction in capital and weakening of highly vulnerable households (Michiels et al. 2008; Michiels and Egg, 2008; Blein and Egg 2009).

The very rationale behind the optimum strategy (founded on risk and crisis management) was thus called into question. Consequently, a structural change seemed to be necessary to stabilise prices and harvests and reduce the vulnerability of households. Nevertheless, the non-development of the B-instruments and the D-instruments crisis are not decisive arguments against the optimum strategy. We might think (and some people do) that living with unstable prices is preferable to price stabilisation. Beyond observing the failure of the B-instruments and D-instruments, it is therefore necessary to analyse the arguments against price stabilisation (the informational role of prices and the “natural insurance” of producers).

### 5.2. The informational role of prices with regard to “endogenous” instability and imperfect expectations

We have long known that prices are signals that guide the behaviour of economic actors (Hayek 1945). Stabilising prices therefore means preventing them from fulfilling their informational (and incentive) role correctly.

This is nevertheless only true if price movements correctly reflect the changes in the fundamentals. However, we know that this is not always the case. The markets are not always

efficient in terms of information. Price movements linked to fundamentals can be amplified by the *cobweb*, speculation or other phenomena affecting expectations. This is what we have referred to as “endogenous” instability. In this case, *prices do not convey the appropriate information to the economic agents. On the contrary, they mislead them.* The solution would therefore seem to be to stabilise prices such that the endogenous component of price instability is eliminated *without affecting the natural or imported price instability component.* In this case, price stabilisation strengthens the informational role of the markets by improving the correspondence between price movements and the movements of fundamentals. This is, for example, the idea behind the mechanism put forward by IFPRI to stabilise international prices (Von Braun and Torero 2008). This “extended optimum strategy” would appear difficult to implement, as it often requires the “real price” to be computable, the “real price” being the price that would arise on the market if there were no endogenous instability. Indeed, it is necessary to know this “real price” to determine the trigger thresholds for public intervention.

Furthermore, *even in the absence of endogenous instability, price stabilisation may be desirable, as it allows the quality of expectations to be improved.* Numerous decisions, such as those concerning production or storage, are taken on the basis of expected prices in the future. As price stabilisation helps to improve the expectations of economic operators, it may have a beneficial effect on resource allocation, even in the absence of endogenous instability. This leads us to consider price stabilisation beyond the point that is strictly necessary to handle endogenous instability.

### 5.3. The effects of “natural” insurance for producers

The central idea of natural insurance is that there is a negative correlation between the price level and the harvest level. The price risk and harvest risk therefore partially offset one another. Consequently, price stabilisation may lead to the increased instability of producers’ incomes (Newbery and Stiglitz 1984). The practical result would seem to be that the problem of price instability must be handled *without stabilising prices*, a position which is the core of the underlying doctrine of the optimum strategy.

To what extent does such a “natural insurance” exist as a result of the correlation between price and harvest levels?

*This primarily depends on the type of instability.* In situations of imported instability, the price on the domestic market depends on the import parity price, i.e., the international price, freight costs and the exchange rate. It is therefore somewhat improbable that the price is correlated with the size of the harvest in the country (this is proper to “small” countries as defined by the theory of international trade: their level of production does not affect the international price). Even more so, it is highly improbable that price is linked to harvest levels of individual producers. In situations of (purely) *endogenous* instability, price instability is in no way linked to harvest instability, only to the variability of expectations. Consequently, there is no “natural insurance” in the case of endogenous instability. In the end, it is only in situations of *natural* instability that a negative correlation may exist between harvest size and the price level.

However, even in the case of natural instability, *the existence of such a “natural insurance” depends on the type of producer.* For many producers, the correlation is probably relatively weak. It implies that the level of the producer’s harvest is strongly correlated with the size of the harvest in the country as a whole, which, in part, assumes that the producer is located in the main production zone of the country (if such a zone exists, as production is often distributed between several different climatic zones). Furthermore, for producers in a situation

of deficit, “natural insurance” has an inverse effect: these producers have to buy large quantities on the market to feed their family when the harvest is poor (and prices are therefore high)! In certain countries, producers in a situation of deficit represent a very high proportion of the number of producers (approx. 60% in Kenya and Ethiopia for example).

We have seen that the body of arguments against price stabilisation does not hold. This shows that *there is much to be gained from stabilising prices*, even taking into account the informational role of prices and the natural insurance of producers. This leads us to consider the practical terms and conditions of this price stabilisation.

## **6. Stabilising prices to stabilise incomes**

Even during the period of domination of the “optimum strategy” in the academic arena, some dissenting voices continued to support the need for price stabilisation, at least in certain situations (Timmer 1989 and 1997; Dawe 2001). However, the mark of the “optimum strategy” first being called into question by the mainstream can doubtless be traced back to a think tank led by the World Bank and DfID in 2005 (cf. Byerlee et al. 2005 and 2006). Their analysis does not classify B-instruments as being of no use, but as being insufficient. The pragmatic solution put forward involves designing price stabilisation based primarily on A-instruments.

The approach adopted in this study consists not of opposing, as a matter of principle, the market-based instruments of stabilisation (A-instruments) and those relying on public intervention (C-instruments), but of analysing them simultaneously to understand their complementarities and antagonisms. This involves adopting the concept of a “stabilisation strategy” capable of mobilising both A-instruments and C-instruments.

### **6.1. Price “stabilisation strategies”**

When price instability is based on real disequilibria between supply and demand (i.e., when it is natural or imported), price stabilisation involves the stabilisation of supply. This can be achieved in four different ways (each making use of A-instruments and C-instruments): by stabilising production (modernisation of production); by intensifying domestic trade and private storage (modernisation of the markets); by regulating foreign trade; or by turning to public storage. When, however, price instability is the result of the instability of expectations (endogenous instability), the solution requires the stabilisation of expectations.

The first two stabilisation strategies (modernisation of production and modernisation of the markets) do not involve specific stabilisation objectives. They consist of improving the performance of private actors with a view to stabilising prices. However, the two subsequent strategies (market regulation by controlling foreign trade or through public stocks) involve defining the “intervention price” (trigger threshold for public interventions).

This raises three types of problem that may, if left unresolved, seriously compromise the efficiency of the stabilisation policies.

The first concerns *the level* of the “intervention prices”. The trick is to determine a broad enough band (to allow trade over large distances) but not too broad (to eliminate extreme values). The intervention price band should also be progressive, i.e., it should follow the long-term price trend. Once again, however, it is a question of finding a happy medium: too flexible a band becomes uninteresting to market actors. The international agreement on natural rubber illustrates the case of a band that is both too broad and too flexible (Gilbert 1996)<sup>2</sup>. Conversely, a stabilisation that is too ambitious (narrow price band) or running contrary to the long-term market trend is doomed to failure. The intervention price level therefore strongly influences the feasibility and credibility of the stabilisation policy.

Some people have suggested developing asymmetric stabilisation (incorporating a floor price but no ceiling) with a view to avoiding the crowding out effect on private stocks (Coulter 2005). While we can discuss whether or not a price ceiling is necessary to protect consumers, one thing remains certain: a stabilisation policy without a price ceiling would not be *credible*. Everyone knows that in the event of a strong price increase, the government will intervene. It is therefore better to apply a symmetrical stabilisation (with a floor price and a ceiling price). Whatever the case, the problems linked to the crowding out effect can be solved by the transparency of intervention policies.

The second problem concerns *the transparency* of stabilisation policies. This transparency primarily concerns the intervention prices. These must be published, credible and respected. Transparency is necessary, for otherwise price stabilisation policies may increase market actors’ uncertainty rather than reducing it. Expectations will only be improved and the risk reduced if public interventions are predictable. This improvement in expectations and reduction in risks is, then, necessary to stimulate the expected effect from price stabilisation: the development of investments facilitating the modernisation of the production, processing and trade of agricultural products.

A more hotly disputed question relates to whether or not transparency concerning the resources allocated to stabilisation policy is desirable (the allocated stock or budget). Some analyses suggest that transparency concerning resources increases the probability of speculative attacks against the stabilisation policy (Salant 1983). Transparency concerning resources can nevertheless strengthen the credibility of the policy (if considerable resources are employed). It can also be a means of avoiding asymmetric information, whereby information is available to certain actors close to the centres of power but not to others.

Finally, the third problem concerns the *credibility* of the policies of intervention. Transparency only creates predictability if the announced policy is believed by the market

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<sup>2</sup> With the benefit of hindsight, the commodity agreement experiment has been revised in a slightly less unfavourable context. While the International Tin Agreement failed in 1985, it had previously succeeded in controlling the price of tin for 25 years (Gilbert 1996). Furthermore, it is the only commodity agreement to have failed: the others were abandoned for other reasons: “*But no other commodity agreement has collapsed -instead, they have lapsed. In sugar, this was because of adverse market conditions which made any attempt at stabilization impractical. In cocoa, there was never sufficient support for stabilization for the authority to have the funds to intervene effectively in a market which in any case moved from a chronic state of deficient capacity in the 1970s to chronic excess capacity in the latter half of the 1980s. In the coffee market, stabilization was effective both in raising prices and containing their variability, but intervention lapsed because of disagreement over the division of the benefits between countries, and because the effects of high prices often did not reach the coffee farmers. By contrast, the natural rubber agreement soldiers on but only by intervening at such a low level as to cause little enthusiasm in producers and little resentment in consumers*” (Gilbert 1996, p. 16).

actors and is effectively applied. However, policy-makers may be tempted not to respect the published policy. For example, in the event of a sudden price increase, they may be tempted to intervene before the price reaches the stipulated price ceiling. If the market actors expect that the published intervention prices may not be respected, they will fear that public intervention could influence prices at any time. They will therefore reduce their stocks (crowding out effect) and abstain from investing in the modernisation of production, processing and market infrastructure and institutions.

How can intervention policies be made credible? The only solution would appear to be to introduce a certain degree of inflexibility in defining and modifying stabilisation policies. This inflexibility is achieved through restrictive rules and by the involvement of parties other than governments. These may include donors (as shown by the case of the PRMC in Mali) or the implementation of an independent agency to manage the stabilisation policy (modelled on central banks that are independent of their respective governments). Many other solutions can be envisaged (depending on the local context). What is certain is that the transparency and credibility of stabilisation policies are *sine qua non* conditions of their own success.

Finally, it should be noted that non-intervention is not a credible policy (Poulton et al. 2006). Everyone knows that in the event of a sharp rise or fall in prices, the government will intervene. A better option is to fully assume a realistic stabilisation policy published in advance and respected by the government.

As we have already mentioned, the causes of instability are a crucial factor in the performance of price stabilisation strategies and instruments. We will therefore present the stabilisation policies for each cause of instability.

## 6.2. Stabilising prices in the event of “natural” instability

In the event of “natural” instability, price stabilisation can be achieved by several different means (not exclusive).

**The first means involves attacking the evil at its root, i.e. reducing production variability** (which in this case is the cause of price instability). This can be achieved by acting on the natural hazards affecting production (drought, locusts etc.), by reducing the sensitivity of production to these natural hazards or by increasing the price elasticity of production (if production is elastic, producers react to a poor harvest by increasing their production plans the following year). Reducing unforeseen events is almost impossible in practice except, perhaps, on an international level (talks on climate change). Reducing the sensitivity of production to unforeseen events or increasing the price elasticity of production requires the development of technological packages (irrigation services, resistant varieties, pest and disease management etc.).

This policy often involves subsidies for inputs, which may pose major governance problems. Experience shows that the provision of subsidised inputs has often been used by politicians to maintain a vote-catching network (Bates 1981). Subsidies can also prove to be very costly. One means of reducing the cost involves implementing conditional subsidies that only take effect when the previous harvest was poor (thereby aiming to avoid successive poor harvests).

This policy may also at times be limited by the availability of technologies that reduce the sensitivity of production to unforeseen events or that increase yields. For example, the

technologies available for millet and sorghum are relatively limited, while these commodities are of strategic importance for food security in the countries of the Sahel.

Furthermore, the results of the policy are uncertain, as it is often difficult for producers to adopt the technological packages. Credit and instruments to help cover price and production risks can help to a certain extent, but the costs of these instruments discourage individuals from using them. There is, then, a vicious cycle between price instability and agricultural investment. As producers are risk averse and prices are variable, they do not invest. As producers do not invest, production is sensitive to unforeseen events and prices are unstable. A prior price stabilisation would therefore appear to be a necessary condition for the success of production stabilisation policies. This seems to be confirmed by the fact that successful past experiments in the “green revolution” always combined access to effective technologies and price stability. This is the case in different countries in Asia and more recently in Malawi. In short, it can be said that in the long term and in situations of natural instability, the most intuitive solution for stabilising prices requires the implementation of efficient production structures, which in turn require a prior stabilisation of prices.

This leads us to examine the other approaches to stabilising prices. These *involve managing surpluses and deficits*. As harvests are variable and consumption is regular over time, a series of successive surpluses and deficits arises. Thus, a good harvest (or a succession of good harvests) generates surpluses, causing prices to fall. If we want to prevent prices from falling too low, we must remove the surpluses from the market. Conversely, in the event of poor harvests, it may be necessary to supply the market to prevent prices from soaring too high. *This regulation of supply can be achieved by intensifying domestic trade, private storage, turning to the international market or public storage operations.*

Consequently, **the second means involves modernising the market**, i.e. promoting the emergence of efficient institutions and infrastructure for the marketing and storage of food commodities (development of A-instruments). The food market (both national and regional) indeed plays a major role in managing surpluses and deficits. It is the market that determines the intensity of both spatial arbitrage (“domestic trade”) and temporal arbitrage (private storage). Modernising the market is, however, a complex affair. The reasons for the blockage are several and varied.

First, they are partly due to the interdependence between the instruments leading to problems of circularity: instrument x requires the prior existence of y to develop but y requires the prior existence of x. Let us take the example of warehouse receipt systems, which play a pivotal role in modernising the markets. Warehouse receipt systems allow storage to be outsourced (to certified warehouses). One of the incentives for using warehouse receipt systems is that the certificates provided by the warehouses as proof of the stocks owned by the producers or traders can be used to obtain credit within the banking system. However, for this to be achieved, the bank must be able to estimate the value of the stock, therefore implying the prior existence of quality standards and a market information system which publicises prices by quality that can serve as a reference. However, the development of standards is itself often given impetus by the existence of warehouse receipt systems (standards lower the cost of storage in warehouses that apply warehouse receipt systems, as stocks from different owners can be mixed). The development of warehouse receipt systems therefore presupposes the existence of standards which themselves require the prior existence of warehouse receipt systems for their development. Similarly, access to credit made available thanks to the existence of warehouse receipt systems is greatly facilitated by the existence of exchanges



through which banks can, if necessary, sell the warrants in the event of default on the loans granted. At the same time, however, the development of exchanges is made much easier by the existence of warehouse receipt systems (especially if the warrants are transferrable). One of the roles of public authorities may be to unfreeze the situation by supporting the development of certain instruments (including through public goods or subsidies) with a view to encouraging the emergence of others. The state could, for example, create conditions favourable to the development of warehouse receipt systems, in particular by passing a law on warehouse receipt systems and by developing a cadre of reliable and incorruptible certifiers.

A second difficulty (linked to the first) results from the fact that each innovation in terms of A-instruments must be profitable in itself to survive and to allow subsequent innovations. This is a characteristic typical of the evolutionary dynamics of institutions. Cronon (1991) demonstrated how such a succession of profitable innovations was made possible in the case of Chicago and facilitated the emergence of warehouse receipt systems and then the first futures markets in history.<sup>3</sup> It is not certain that such a combination of favourable circumstances will occur in modern-day Africa, but nor is it improbable. As warehouse receipt systems involve high costs (standardisation, control of the qualities and quantities specified on the warrants, etc.), the incentives must be sufficient (in terms of cost reduction) to encourage operators to participate in this system. It is not impossible, as warehouse receipt systems can prove to be very useful to a wide range of actors (producers, traders, processors, aid agencies, speculators etc.) for very diverse reasons (securing supplies, obtaining credit, guaranteeing quality, etc.). The state could also facilitate the process by temporarily subsidising certain A-instruments until such time as the complementary instruments are introduced and the different synergies come into play.

A third difficulty is linked to price instability itself. The introduction of efficient infrastructure and institutions for the cereals market requires investments that are only possible if the risks are not too high. This is especially the case for private storage but also, to a certain extent, for warehouse receipt systems. As with the modernisation of production, the modernisation of the market can be greatly facilitated by the introduction of a price stabilisation policy<sup>4</sup>.

In the long term, the modernisation of production and the modernisation of markets are the solutions to the problem of natural instability (World Bank 2008; De Janvry 2009). These solutions are therefore essential, even if they are difficult to implement because they imply structural change to the forms of production and trade. This structural change itself requires prices to remain relatively stable. It is therefore necessary to envisage other solutions to manage the problem of price instability until the modern production and trade structures emerge and can take over. They must also facilitate these structural changes. To do so, they must be designed with both their (short-term) effects on price stability and their (long-term) effects on the modernisation of production and the development of the markets in mind.

There are two solutions (i.e., two stabilisation strategies) that can be implemented to achieve this. The first involves turning to the international market (to sell off surpluses and/or compensate for deficits). The second consists of developing public stocks. Recourse to the

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<sup>3</sup> The initial impetus was the development of the railways, which resulted in considerable cost savings when transporting cereals (previously transported by boat via Saint Louis). However, this innovation in turn created a logistical problem: the choking of the railways due to the time necessary to empty the trains. The solution was to store the cereals in bulk in the wagons and to use grain elevators to unload the wagons directly into the warehouses. Such a system required the quality to be graded and the owners of the cereal to be provided with a certificate specifying the quality and quantity of the cereal owned: and so the warehouse receipt system was born.

<sup>4</sup> In the case of the regional market, the trade restriction policies introduced by the state (e.g., temporary export bans) may be an additional source of instability. The modernisation of the markets is also achieved by eliminating customs protection (and informal taxes) within the regional territory.

international market comes in two packages. The light version involves increasing the level of openness of the country by reducing taxes and quantitative restrictions on imports and exports (or even by subsidising them). The more ambitious version involves regulating import and export flows to stabilise domestic availability: it therefore relies on *variable* measures (taxes, subsidies, and quantitative measures).

In principle, different *efficiency* considerations lead to a preference, where possible, for **recourse to the international market over regulation by buffer stocks**.

The first argument is that *recourse to the international market* presents an undeniable advantage: *it is like an unlimited stock*. Thus, for a “small country” in the sense of the theory of international trade, the state can always find the quantity required on the international market to cover a deficit. Conversely, the international market can always absorb surpluses. This makes the tradability of products (their capacity to be traded on the international market) a very important variable of stabilisation policies<sup>5</sup>. In contrast, public stocks have a limited stabilisation capacity. A much cited result is that of

ensembleit au niveau de l'tégieeage privé ou publicmentairesorgho -qui roducteurs réagissent à une mauvaise récolte en□□□□□□□□□□Townsend (1977) according to which price stabilisation by means of a public stock will necessarily fail if we consider a sufficiently long period of time. Situations will necessarily occur in which the stock will be exhausted and will be unable to contain the price rise. Conversely, if the storage capacity (infrastructure, fund intended for the purchase of cereals) is saturated, it is no longer possible to buy and it will be impossible to stop the fall in prices. The stock must therefore be large (and thus costly) to be able to cope with a succession of poor harvests or to absorb a succession of surplus harvests.

The second argument concerns costs. Research concerning the case of wheat and rice in India demonstrated that for the same amount of public spending, it was possible to obtain a reduction in the coefficient of variation of price almost four times as high through the implementation of border controls as through a buffer stock, even once the restrictions imposed by GATT had been taken into account (Srinivasan and Jha 2001). This argument must nevertheless be qualified, in particular in the case of landlocked countries. For these countries, because of the high transport costs, there is a significant difference between the parity prices for imports and exports. Recourse to the international market to stabilise prices would require a considerable reduction in import and export taxes or even subsidies. This opens up the idea that the respective costs of border control and recourse to a buffer stock could be different depending on the country: in favour of border controls for coastal countries but sometimes in favour of buffer stocks in landlocked countries. A similar observation was made with regard to East Africa (Coulter 2005).

*Nevertheless, in certain situations, stabilisation through recourse to the international market is impossible, ineffective or costly.*

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<sup>5</sup> Some people contest this importance for the reason that non-tradable goods (such as millet and sorghum in West Africa) are the object of trade on the regional market. To what extent can the regional market play the same role of “unlimited stock” as the international market? We might doubt its ability if we consider ted examples of the 2005 crisis in Niger and the cereal export bans decreed by numerous West African countries in 2008 (although it is true that the international market can also be exposed to this problem, as was the case with the rice export bans decreed by numerous countries in 2008).

This is particularly the case for so-called “*non-tradable goods*”. Sometimes, the good for which we want to stabilise the price cannot be the object of international trade. Nevertheless, it is sometimes possible to stabilise the price of this good by regulating imports or exports of goods which can be used as substitutes. This is not, however, always possible, as non-tradable goods are sometimes poorly or not at all substitutable with tradable goods. This is the case for so-called “coarse grains” (millet, sorghum and maize) in West Africa: these are non-tradable and have a low rate of substitution with rice (Daviron et al. 2008). It is nevertheless possible to *endeavour to make previously non-tradable goods tradable*, even if this is a long-term action. The keys to this are the standardisation of product quality (to facilitate the creation of standard lots) and stock bulking (to allow the quick mobilisation of large volumes). Warehouse receipt systems can play a major role in this process through their close links to the development of quality standards and the quick mobilisation of stocks. It is also possible to work towards making non-tradable goods more substitutable with tradable goods. In West Africa, for example, processing millet to allow a simple and quick preparation could increase its substitutability with rice.

Recourse to the international market to stabilise domestic prices is also difficult in *large countries in the sense of the theory of international trade*, i.e., where imports or exports represent a sufficiently large proportion of international trade to affect the international price. In this case, the international market no longer represents an unlimited stock from which the country can take what it lacks or on which it can sell its surplus. The country is no longer a price-taker: its imports, for example, cause the international price to rise. Recourse to the international market to contain the rise in domestic prices is then no longer an effective strategy.

A further problem arises when the *import capacity of a country is limited* (for example by its foreign exchange holdings). Foreign support can help to overcome this type of problem (cf. the IMF payment facilities system which allowed countries to buy currency when they need to import).

Finally, recourse to the international market may also be ineffective in stabilising prices in situations where the parity prices are highly unstable. This occurs when international prices or the exchange rates are themselves highly unstable. This is not a theoretical hypothesis. As we have already mentioned, most specialists agree that we have entered a period of high cereal price instability on the international markets. In this case, one possible strategy is to work towards increased international price stability (cf. the proposals of IFPRI and the World Bank already cited). Finally, it is possible to support the monetary stability of countries (the CFA franc zone is a good example).

### 6.3. Stabilising prices in the event of “imported” instability

When instability is imported, recourse to border controls is unavoidable. Stabilising domestic prices requires the stabilisation of parity prices, which can only be achieved through the regulation of foreign trade. Regulation by means of buffer stocks can be envisaged, but it has numerous limitations. The stock runs the risk of running out if international prices remain high over a long period, as illustrated by the Indonesian crisis of 1997-1998 (Gérard 2000). Conversely, the cost of holding this stock may increase considerably if international prices remain low over a prolonged period. It is therefore highly unlikely that a high level of imported instability can be regulated by means of a buffer stock, even if a buffer stock can be

justified in terms of assuring supplies until imports can arrive (in particular, in landlocked countries).

**Parity price stabilisation through the regulation of foreign trade is thus the only option open. It is nevertheless not always possible to implement it in practice.** In certain situations, borders cannot be controlled. This is the case for land borders in Africa, which are particularly porous in light of the smuggling and corruption. The avoidance of the cereals export bans imposed by numerous countries in West Africa during the crisis of 2007-2008 illustrates this porosity particularly well (Staatz et al. 2008). However, this reasoning also applies to borders with the international market. After all, the porosity of land borders can, due to re-export trade, lead to a certain porosity of borders with the international market. A famous example is the case of Benin, which long re-exported rice to Nigeria at a time when Nigeria prohibited or heavily taxed imports of this product (Galtier and Tassou 1998). The introduction of a policy at a regional level (or at least the coordination of national policies) may be a solution to this problem.

**When border controls are possible, tariff barriers are much more preferable than quantitative restrictions.** It is much *easier to stabilise domestic prices using taxes or subsidies (variable) than via the temporary imposition of quotas or trade bans*. The prices resulting from the application of the policy are indeed easier to anticipate with tariff measures than with quantitative measures. In the case of quantitative measures, a precise knowledge of the functions of supply and demand is required to predict how prices will evolve. This is true for both public authorities and private actors. Stabilisation through tariff measures is this more transparent and more predictable: it generates less distortion for market actors, and its depressive effect on private stocks (crowding out effect) is therefore weaker. Finally, *tariff instruments are symmetrical* (either taxation or subsidy is possible), while quantitative instruments are asymmetric (when all restrictions are removed, it is impossible to lower prices further).

**The problem is that quantitative measures are often less difficult to implement.** First, *variable taxes and subsidies on imports and exports are prohibited by the WTO*. On the other hand, quantitative measures are permitted for food commodities. Thus, the cereals export bans taken by numerous countries during the crisis of 2007-2008 in no way contravene the rules of the WTO. Certain experts feel that this is a problem: it has therefore been suggested that quantitative restrictions on exports should be prohibited (Lin 2008). *Moreover, the symbolic effect of the prohibition or rationing of exports* is also very different from that of a tax on exports. Quantitative measures send a message that the state intends to protect the population from famine whereas taxes, on the contrary, give the impression that it wants to take advantage of the situation to increase tax revenue. This political economy dimension (linked to the legitimacy and acceptability of the government's policy) should also be taken into account. Finally, certain experiences lead us to believe that the *effective application of quantitative restrictions is easier to control* than that of tariff measures (it is simply a question of inspecting trucks or boats). An example of this phenomenon can be seen in India, which attempted to implement minimum export prices in October 2007 (higher than the prices in force at that time on the international market), which should, in theory, have stopped exports. In reality, exporters were able to avoid the measure to such an extent that in April 2008, the Indian government announced an export ban, which proved to be effective (Timmer 2009).

In the medium term, the solution might be to **promote the growth of domestic production** by protecting it through customs duties (although these are capped by the WTO) and/or by supporting it by means of subsidised inputs (De Janvry et Sadoulet 2008). This strategy would nevertheless seem better suited to countries very close to achieving food self-sufficiency than to countries with a high deficit. This strategy also generates perverse effects at a collective level: generalised protectionism makes international markets narrower and thus more unstable. Furthermore, it reduces the efficiency of resource allocation, thereby generating higher production costs (and higher prices) (Bricas et al. 2009).

We therefore find ourselves without an efficient instrument for controlling borders and thereby countering imported instability. **This gives rise to the need for action to stabilise international prices or for the relaxation of the WTO rules concerning variable taxes.** It is very unlikely that the WTO will modify its stance on variable taxes, but it may be possible for developing countries to negotiate an exception for cereals (given their importance to food security) or even to obtain a relaxation of the conditions necessary to resort to the special safeguard clause.

#### 6.4. Stabilising prices in the event of “endogenous” instability

When instability is endogenous, two (complementary) approaches may be adopted. The first involves attacking the origin of the price instability, i.e., the instability of expectations. The second consists of reducing the effects of the instability of expectations by reducing the price elasticity of supply.

##### **The strategy for stabilising expectations depends on the cause of their instability**

If the instability of expectations is fuelled by natural instability, the natural instability must be handled as explained in paragraph 6.2. Another option is to improve the predictability of the natural instability (for example, by publishing crop forecasts).

Similarly, if the expected instability is the result of imported instability, the latter must be treated (as described in paragraph 6.3) or its predictability must be improved (for example by publishing estimates concerning the evolution of the international market, the exchange rate and shipping charges).

The instability of expectations can also be fed by public interventions. Whatever the type of intervention selected, the public stabilisation policy must be transparent, i.e., the intervention prices must be announced in advance, be credible and be respected. This means that the ambitions for stabilisation must be limited (a broad band evolving with the long-term market trend). Finally, sufficient means must be invested in the operation; otherwise, there is the risk that stabilisation will fail or be subjected to speculative attacks.

The instability of expectations can also be generated within the futures markets and other mechanisms causing expectations to spread from one person to the next. In this case, the solution consists of regulating the operations of the futures markets (for example, by restricting the positions of non-commercial actors). The example of the *Chicago Board of Trade* provides a great many lessons. This market was regulated by the Roosevelt administration following its supposed role in the stock market crash of 1929. It was deregulated relatively recently by the Bush administration, leading to an exponential development of speculative activities. According to some specialists, this played a major role in the price hike of 2007 – 2008 (Masters and White 2008). Another option involves

introducing taxes on futures and options market transactions to limit speculation, reflecting the famous proposal of Nobel Prize winner James Tobin.

In general, the existence of large stocks tends to stabilise expectations (the operators expect that the stocks will be able to absorb any crises which might occur). The effect will be even greater if the stocks are visible, as this has also a stabilising effect on shared expectations (everyone expects that prices will be stable thanks to the stocks and expects that the other actors also expect this price stability).

### **A complementary strategy involves reducing the effects of the instability of expectations**

A *structural* strategy involves reducing the elasticity of supply. In this case, the actors' response to the variations of their expectations is more limited. It is this response (in terms of production, purchases, sales or storage) that causes price instability. This strategy is contrary to the belief (deeply rooted in economists) in the benefits of the fluidity linked to arbitrage (between crops, production techniques, locations, moments in time etc.). The strategy is nevertheless dangerous because by reducing endogenous instability, we run the risk of increasing natural instability (because the price elasticity of supply has a stabilising effect in this case). Conversely, by wanting to increase the elasticity of supply to reduce natural instability, we run the risk of creating endogenous instability. To what extent should the production and trade structures be modernised? General speaking, the problem of endogenous instability is still relatively inexistent in Africa due to the numerous obstacles to arbitrage. The increase in the elasticity of supply (through the modernisation of production and trade structures) would therefore almost always have a stabilising effect.

A *short-term* strategy involves implementing *ad hoc* measures to break the speculative dynamics. *It is, for example, possible to remove import taxes (or even to subsidise imports) and to tax or limit exports to curb the price increase.* Using this instrument is nevertheless risky, as private actors can speculate on this policy being abandoned because it is too costly to the state. Furthermore, use of the instrument is severely restricted by the WTO rules. Finally, it cannot be implemented with a view to containing the speculative fever present at an international level. An alternative solution involves attempting to *contain the price spiral by using a buffer stock*. The proposal of IFPRI to counter speculation on the futures markets corresponds to this view (Von Braun and Torero 2008). This option is nevertheless relatively dangerous, as the probability of speculative attacks against the public stock is very high indeed. Nevertheless, this type of policy can be crowned with success if it is credible and if the stock volume is sufficiently large. It then plays a role which is both *ex ante* (by discouraging speculation) and *ex post* (interventions to contain the speculative spirals).

In this section, we have analysed (for each cause of instability) the different instruments that can be adopted to stabilise prices. When price instability is the result of several causes, combined solution must be envisaged. Furthermore, with regard to basic food commodities, stabilising prices is not enough. The stabilisation policy must be accompanied by a policy targeting vulnerable households. As we shall now see, this policy must be structural, thereby considerably renewing the role of D-instruments.

## 7. The changing paradigm of D-instruments

D-instruments were long considered as food crisis management tools. As the crises were perceived as the result of a problem of physical availability (linked to poor harvests), the choice of D-instruments primarily concerned occasional aid targeting rural households living in “deficit” zones or zones “at risk”. Once it was accepted that food crises are not always linked to problems of physical availability but are often due to problems of economic access – **the rationale changed from one focusing on risk management to one focusing on structural change aiming to attack the causes of household vulnerability**. Beyond managing the effects of crises, the aim is to rebuild and strengthen the capabilities of households to cope with food insecurity. This involves medium- and long-term programmes (not limited to periods of crisis) aimed at rebuilding household capital. These programmes (which can also concern urban populations) favour money transfers to enable the beneficiaries to define their own prevention strategies themselves. Such programmes were, for example, implemented in East Africa as seen in the actions of the European Union in both Malawi (Social Cash Transfers) and Ethiopia (Productive Safety Net Programme).

This evolution of D-instruments from a short-term action to a more structural action also caused their interaction with the food markets to be reviewed. The idea is that **D-instruments should not only disturb the markets as little as possible but should also contribute to facilitating their modernisation**.

As D-instruments were traditionally based on food aid, public interventions based on D-instruments caused the market actors to run risks. This discouraged investments in market infrastructure and institutions (in particular those linked to storage). De facto, D-instruments were highly criticised for generating distortions. The real aim of the food aid charter developed by CILSS and the Club du Sahel (signed in 1990) was precisely to ensure that aid does not disturb the market. What procedure should be adopted? When crises were seen as being the result of a lack of physical supplies, people looked for a solution in the monetisation of aid: food aid provided by donors was sold by the governments at the market price. With the recognition, since the end of the 1990s, of problems of the households’ economic access, new approaches were introduced: free distribution and sales at low prices. These approaches led either to the introduction of a system parallel to that of the market (in particular in the case of free distribution) or to use of the market, disturbing its operations (in the case of sales at low prices). This led to great attention being paid to the question of targeting to limit distortions. This sometimes even led to a “targeting obsession”, i.e., excessive targeting generating high costs and leading to the exclusion of a proportion of vulnerable households that needed aid.

Including D-instruments in a long-term strategy of structural change (the new paradigm) leads to renewed attention to how they interact with food markets. It is not simply a question of reducing market distortions generated by the D-instruments. Solutions have been put forward to encourage D-instruments to contribute to the development of the market. The first involves resorting to cash transfers rather than food aid. This leads to consumers who would otherwise have been insolvent being linked to the market. This solution is only possible, however, when markets operate correctly and are sufficiently supplied. If this is not the case, food aid is necessary. When food is bought in developing countries by aid agencies (cf. the Purchase For Progress programme developed by the WFP), these purchases may have a beneficial effect on the modernisation of the markets (dissemination of quality standards, development of a “contract culture”, access to credit etc.). However, this often leads to a market within the market, with some operators specialising in supplying the aid agencies. The use of warrants

could be a solution to this problem by opening the market of supplying aid agencies to a larger number of market actors. Purchases made by the aid agencies would then contribute more to the modernisation of the markets.

However, the participation of D-instruments in the structural changes to agriculture in developing countries cannot be restricted to rebuilding household capital and ensuring improved connections with the food markets, even if these actions are every useful in reducing household vulnerability. In the long-term, measures to rebuild productive capital do not provide a real way out from the crises. Vulnerable households in rural areas live on very small farms with limited potential. Lifting their productive capital to its pre-crisis level is a means of reducing their vulnerability to crises. It is not, however, a means of promoting their structural change to ensure better integration in the economy of tomorrow. From the standpoint of modernising agriculture (the green revolution), some households will have to specialise in certain crops, invest and become more productive. Conversely, others will no longer be competitive and will have to leave the agricultural sector (either partially or completely). Vulnerable households belong to the second category. **A long-term vision of D-instruments** (in which they contribute fully to the structural changes to agriculture in developing countries) **must review their role in accompanying structural changes** (diversification of the households' economic bases, link to non-agricultural rural activities, access to the labour market either locally or elsewhere etc.).

## 8. Conclusion

The doctrine that was predominant from the 1980s until the crisis of 2008 (the “optimum strategy”) was that income was to be stabilised “without affecting prices”. Price instability was handled by risk management using private insurance and hedging instruments (B-instruments) or public instruments targeting vulnerable households (D-instruments). This strategy failed on two fronts: the expected development of B-instruments never arose for foods and the D-instruments did not stop the nutritional situation of vulnerable households from deteriorating.

This has led to the **shift from a rationale based on risk management to a rationale based on structural change**. This shift is reflected in particular by the promotion of modernised production and trade structures for food goods with a view to stabilising both harvests and prices rather than relying solely on insurance and hedging instruments. Such a modernisation or “structural transformation of agriculture” is an essential condition for the economic development of African countries. In the long term, this modernisation will lead to more stable prices, but in turn requires stable food prices to be able to develop. Realistic, transparent and credible price stabilisation policies must be introduced to facilitate this process. The D-instruments must also be renewed, not only to reconstruct the capital of vulnerable households but also to accompany their adaptation to the structural changes. In this new paradigm, B-instruments also have a new role: that of permitting the actors implementing public interventions to protect themselves from instability. Price stabilisation policies risk giving rise to a shift of instability towards other variables (budget, currency revenue etc.). The state (or donors) can cover themselves by using weather index insurance or hedging instruments (futures, options) (Faruquee et al. 1997 ; Dana et al. 2006). Some successful experiments exist. Thus, in 2005, the government of Malawi used a purchase option on white maize. The WFP has also used insurance to protect itself against climatic risks in Ethiopia.



The causes of price instability are numerous (“natural”, “imported” and “endogenous” instability). **Identifying the causes of price instability is a prerequisite to policy design, as the same instrument can have a stabilising or destabilising effect depending on the situation.**

Whatever the cause of the instability (and more importantly if the instability has several causes), **the combined use of different instruments** is often desirable or necessary. Stabilisation actions can therefore combine public and private instruments—instruments aimed at stabilising prices and instruments aimed at stabilising incomes.

A major element in these complementarities concerns **the timing of the different instruments**, i.e., the lag between the moment they are activated and the moment that the effects are felt. For example, a buffer stock has a much faster effect on prices than does recourse to the international market (in particular, for landlocked countries). Indeed, in addition to this time lag necessary to buy and transport the product, there is also a time lag necessary to sell the stocks purchased before the measure was introduced. For example, the effect of reducing duties on imports is felt when the traders begin to sell cereals imported under the lower duty regime, i.e., several weeks after purchase. Large differences therefore appear in the rhythm at which the instruments produce their effects: an immediate effect for regulation by means of stocks, a lag of a few days for domestic and regional trade, of several weeks for international trade, of several months to boost production and of several years for policies aimed at the modernisation of the production and trade structures. The interaction of the different instruments should take these different rhythms into account. For example, public stocks can be used to contain a price increase while awaiting the arrival of imports or the new harvest (possibly stimulated by subsidies for inputs).

In particular, fast-working instruments (such as **public stocks or border controls**) may be **used to facilitate the emergence of more efficient production and trade structures**. However, an effective use of these tools requires *realism* (the price band should be broad enough and should follow the long-term price trend), *transparency* (the intervention prices should be published in advance) and *credibility* (the announced intervention prices should be respected).

### **The increasing interdependence between countries gives rise to the need to consider the implementation of regional policies**

Due to regional trade, the food markets in countries belonging to the same region (West Africa, East Africa etc.) are very often highly interconnected. Consequently, it would seem logical to envisage the development of stabilisation policies implemented at a regional level. The question nevertheless differs according to the stabilisation strategies considered.

It would appear pertinent to work on a regional scale with regard to the modernisation of markets. On the one hand, the markets are already largely connected. On the other hand, economies of scale exist not only with regard to the infrastructure (such as roads) but also with regard to market institutions such as quality standards, warehouse receipt systems and exchanges. The initiatives developed by the East African Grain Council with regard to white maize represent a good example of this type of approach. The task is nevertheless difficult because in the event of increasing prices, the countries that usually export to their neighbours may be tempted to close their borders. This is demonstrated by the example of the numerous West African countries that banned cereals exports during the crisis of 2007-2008.

The regional framework would also appear to be relevant for connection to the international market. The lack of harmonisation of customs protection may give rise to a re-exportation trade (the example of re-exportation of rice from Benin to Nigeria remains the most famous case). Furthermore, examples of customs harmonisation already exist (such as the TEC in UEMOA). Once again, however, the situation may become complicated, especially if the countries have divergent interests, a fact that is often the case, as some depend heavily on imports while others are self-sufficient or produce surplus.

The regional framework would also doubtless be pertinent for policies based on public stocks. However, this type of approach (irrespective of whether it is based on a regional stock or the networking of national stocks) may cause major governance problems.

Finally, the regional scale may also be envisaged for production-boosting policies and perhaps for safety nets too. This would mean avoiding spill-over effects between countries that are characterised by the resale in one country of inputs or cereals subsidised in another.

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